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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/785,890	02/16/2001	Robert M. Moore JR.	SU-7073-L	5058

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ALBEMARLE CORPORATION
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EXAMINER

PRYOR, ALTON NATHANIEL

ART UNIT	PAPER NUMBER
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1616

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06/29/2012

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 09/785,890	Applicant(s) MOORE ET AL.	
	Examiner ALTON PRYOR	Art Unit 1616	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 09 January 2012.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) ☒ Claim(s) 11-30 is/are pending in the application.
- 5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 11-30 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Applicant's arguments filed 9/1/12 have been fully considered but they are not persuasive. See arguments below.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 11-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Goodenough et al. (US 3,558,503; 1/26/07) in view of Dallmier et al. (US 5,683,654; 11/4/97).

Goodenough teaches a method of producing an aqueous solution having bromine values of about 0.01 to about 100,000 ppmw useful for bleaching processes, treating swimming pools and disinfecting processes (column 1 lines 13-61). Goodenough teaches a method of producing an aqueous bromine solution comprising providing an aqueous solution of bromine and contacting therewith a bromine stabilizer such as sulfamic acid plus an amount of hydroxide such as magnesium hydroxide sufficient to achieve a final pH ranging from about 8 to about 10 (column 2 lines 1-40). Note, the mixing of magnesium hydroxide with sulfamic acid result in an alkaline metal salt of sulfamic acid which is functionally equivalent to the instant alkali metal salt (sodium) of sulfamic acid. Goodenough also teaches that the molar ratio of bromine to nitrogen (Br₂:N₂) ranges from about 2 to about 0.5, which would have indicated to an artisan that the atomic ratio of nitrogen to active bromine (N:Br) ranges from about 0.5 to about 2 (column 1 lines 66-69).

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Dr. McKinnie's declaration low solubility of alkaline earth metal hydroxide (magnesium hydroxide in Goodenough) in water makes it impossible to make an aqueous solution having a pH of at least 13 when alkaline earth metal is the sole source of hydroxide. The Examiner maintains that Goodenough's method of making a final solution having a bromine content of about 100,000 ppmw differs from the method recited in Moore's claim 11 in the pH of the resulting biocide composition. That is, Goodenough's method yields a biocide having a pH of from about 8 to about 10 (Example 3) whereas Moore's claimed method yields in a biocide having a pH ranging from 13.0 to 14.0. The prior art provided that motivation to modify the method of Goodenough with a reasonable expectation of success. The modification of Goodenough makes the stability results provided in Nalepa's Declaration obvious.

Dallmier discloses a process that "improves on the Goodenough et al. reference by means of a safer, easier, and more economical process." (column 2 lines 45-47). As confirmed by Moore's own expert, Dallmier suggests that a sulfamic acid stabilized hypobromite such as N-bromosulfamate can be stored in a high pH solution ranging from about 8 to about 14 and more preferably from about 11 to about 14 with minimal suspected carcinogen bromate formation. (column 3 lines 28-3; column 4 lines 47-49; column 9 line 65 – column 10 line 60). As taught by Dallmier, the formation of bromate occurs from a reaction involving hypobromite as a reactant and stabilized hypobromite (column 3 lines 24-26; column 10 lines 1-8).

Hence, an artisan would have been motivated to combine the teachings of Goodenough and Dallmier. It would have been obvious to modify Goodenough's process to include a step of increasing the pH of the final solution to 13-14 as indicated in Dallmier in order to minimize the

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formation of the suspected carcinogen bromate during storage, thus arriving at a method encompassed by Moore's claims 11-30.

Neither Goodenough et al. nor Dallmier et al. teach the use of BrCl as bromine source or the instant ordering of steps to yield biocide. Note, Goodenough uses a bromine sources that yield a solution having 100,000 ppmw bromine content. Although the bromine source differs from the BrCl claimed in Goodenough's invention, the final bromine content of 100,000 ppmw bromine in Goodenough reads on the instantly claimed bromine content. For this reason, it is obvious that the solution yielded in Goodenough would be equivalent to the instant solution in terms of chemical and physical properties. Therefore, it is expected that both solutions would exhibit similar biocidal activity. In the absence of an unexpected showing for the instant ordering of steps, the combination of Goodenough and Dallmier make instant ordering of steps obvious. Note, the active steps in the prior art and instant process involves the mixing of the same chemicals: bromine source, sulfamic acid and base. Since the chemical composition is the same for the prior art invention and instant invention, it is expected that the composition yielded in both the prior art and instant claims to show a similar activity, unless a showing is provided demonstrating the significance of the instant ordering of steps.

Response to Applicants' Argument

The Examiner agrees with the Applicants in that all of the issues discussed below have been discussed or argued in previous Examiner's and Applicants' communications and that those communications are essentially of the same content. The Examiner invites an interview with Applicants' representative to clarify and hopefully resolve outstanding issues.

Applicants have amended claims to recite a composition existing at about 13 to about 14 during said BrCl addition in a previous filing. It is important to note that the pH of about 13 to about 14 is addressed in the previous office actions and previous arguments. As previously explained the high pH would avoid or reduce bromate formation. The argument presented by the Board states that the high pH range taught by Dallmier et al. reduces the production of bromate which is carcinogen. Thus, by incorporating Dallmier et al.s' high pH in Goodenough et al.s' process, the production of bromate would be reduced, making the process of Goodenough et al. safer. Thus, the Board supports the combination of Goodenough et al. and Dallmier et al. Applicants restates that Nalepa explained the advantage of a high pH and how the higher pH yields a more stable solution in Declaration filed 8/1/11. The Examiner points out that the Declaration was discussed in previous communication. The Examiner restates that the results in the Nalepa's Table in the Declaration are not convincing since the Table shows only Bromine for the two Goodenough et al. examples instead of the BrCl that can be automatically derived from Goodenough et al combination of chemicals (sulfamic acid, calcium chloride or sodium chloride and bromine). In addition the Table shows only 0.125 moles of hydroxide for the Goodenough et al. whereas the Table discloses 2.025 moles hydroxide for the present invention. This Table does not appear to show a side by side comparison of instant invention versus Goodenough et al.'s invention. Until a side-by-side comparison is done, the instant combination of references makes the 12 wt % - 18 wt % active bromine obvious.

Applicants argue that the bromine source in Dallmier et al. differ from the bromine source in Goodenough. The Examiner points out that the bromine source had been addressed in previous arguments(see below). The Examiner reiterates that the Board considered the fact that

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Dallmier et al. use bromide salt, Goodenough et al. use bromine and instant invention uses BrCl, but still used the combination of Dallmier et al. and Goodenough et al. to support the rejection of the instant claims (For similar reasoning the rejection over Goodenough et al. in view of Exhibits 1001, 1073, 2014, 2022 and 2023 are maintained).

A focus of Applicants' argument is on BrCl and how it truly exists. Applicants maintain the use of BrCl which is not isolated from Br₂ plus Cl₂, water, sulfamic acid and alkali metal sulfamate. Applicants admit that although the claims recite BrCl, the BrCl contains many other components. Applicants states that bromine chloride is an equilibrium mixture of BrCl, Br₂ and Cl₂. The Examiner restates that claims do not show proper representation for BrCl, because according to Mills et al., Tellinghuisen, Farkas and Lewin, Second declaration of Dr. McKinnie. Applicants argue that in Goodenough et al. it is not possible to form and handle pure BrCl. According to the cited literature noted above BrCl in the presence of Br₂, Cl₂, H₂O, sulfamic acid, alkali metal sulfamate yields BrCl in equilibrium with Br₂ and Cl₂, hypochlorite, hypobromous, hypochlorite, hypobromite, HOBr, HCl, bromide and chloride. Hence, the Applicants do not show a true representation of BrCl in the claims, i.e. a mixture of BrCl, Br₂ and Cl₂. Applicants restate that N-chlorosulfamate is produced inherently in the present invention. The Examiner maintains that Goodenough et al can produce N-chlorosulfamate. Goodenough et al. discloses the mixture of sulfamic acid, calcium chloride or sodium chloride and bromine. Note, inherently Goodenough et al. produces N-chlorosulfamate when the chloride (calcium or sodium) reacts with bromine to produce BrCl which is followed by the reaction of the BrCl with sulfamic acid to yield N-chlorosulfamate and N-bromosulfamate.

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Applicants restate that Goodenough et al. disclose a 100,000 ppm upper limit of bromine in order to avoid decomposition of the biocide. Applicants reiterate that present invention maintains the pH of the solution from start to finish at a pH ranging from about 13 to about 14. The Examiner reiterates that an artisan would have been motivated to combine the teachings of Goodenough and Dallmier. It would have been obvious to modify Goodenough's process to include maintaining the pH of the solution from start to finish ranging from 13-14 as indicated in Dallmier in order to minimize the formation of the suspected carcinogen bromate during storage, thus arriving at a method encompassed by Moore's claims 11-30.

Applicants provide data showing that the magnesium hydroxide in Goodenough et al. is not chemically equivalent to the sodium hydroxide in present claims with respect to the nature of this invention (Table). Applicants argue that the results (stability) obtained for a magnesium salt of sulfamic acid and a sodium salt of sulfamic acid are considerably different as depicted in Nalepa's Declaration. Applicants argue that the larger number of moles of hydroxide is explained partially by the larger amount of halogen added to the inventive solution and partially the greater pH of the inventive solution in comparison to solutions prepared by Goodenough. The Examiner reiterates that the results in the Table are not convincing since the Table shows only Bromine for the two Goodenough et al. examples instead of the BrCl that can be automatically derived from Goodenough et al combination of chemicals (sulfamic acid, calcium chloride or sodium chloride and bromine). In addition the Table shows only 0.125 moles of hydroxide for the Goodenough et al. whereas the Table discloses 2.025 moles hydroxide for the present invention. This Table does not appear to show a side by side comparison of instant invention versus Goodenough et al.'s

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invention, i.e. the hydroxide amount (0.125 moles) in Goodenough et al.'s invention differs from the hydroxide concentration amount (2.025 moles) in the instant invention.

The Applicants argue that Goodenough et al. do not disclose or suggest 12% to 18% by wt active bromine as recited in instant claims. The Examiner argues that the independent claims do recite said wt % of bromine. Note, it is obvious to optimize the amount of bromine in order to make the most effective biocide composition.

Applicants argue that there is no reason for an artisan in the field to combine Dallmier et al. with Goodenough et al. Goodenough et al. uses bromine, whereas Dallmier et al. uses bromide salts to avoid the corrosive hazard associated with bromine. Dallmier et al. addresses the problems of the handling issues and corrosive nature associated with diatomic halogens (Mills supports the corrosive nature of bromine). Applicants argue that Dallmier et al.'s process improves on the Goodenough et al.'s process, but not vice versa. Dallmier et al. discard the Goodenough et al.'s process. Dallmier et al. teaches that the addition of base after the halogen addition to the solution, whereas Goodenough et al. observes better bromine stabilization results when hydroxide is added last to the solution. Dallmier et al. teach that their order of addition steps is critical. Thus, it would have not been obvious to combine Dallmier et al. with Goodenough et al. whose order of addition steps differ. In addition, the Board of interferences supports the combination of Goodenough et al. and Dallmier et al. The Board considered the fact that Dallmier et al. use bromide salt, Goodenough et al. use bromine and instant invention uses BrCl, but still used the combination of Dallmier et al. and Goodenough et al. to support the rejection of the instant claims (For similar reasoning the rejection over Goodenough et al. in view of Exhibits 1001, 1073, 2014, 2022 and 2023 are maintained). The argument presented by

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the Board states that the high pH range taught by Dallmier et al. reduces the production of bromate which is carcinogen. Thus, by incorporating Dallmier et al.s' high pH in Goodenough et al.s' process, the production of bromate would be reduced, making the process of Goodenough et al. safer. Thus, the Board supports the combination of Goodenough et al. and Dallmier et al.

In the absence of an unexpected showing for the instant ordering of steps, the combination of Goodenough and Dallmier make instant ordering of steps obvious. Note, the active steps in the prior art and instant process involves the mixing of the same chemicals: bromine source (BrCl instant application and BrCl can be derived from the chlorides being combined with bromine in Goodenough et al.), sulfamic acid and base. Since the chemical composition is the same for the prior art invention and instant invention, it is expected that the composition yielded in both the prior art and instant claims to show a similar activity, unless a showing is provided demonstrating the significance of the instant ordering of steps. The Examiner argues that the results in the Table are not convincing since the Table shows only Bromine for the two Goodenough et al. examples instead of the BrCl that can be automatically derived from Goodenough et al combination of chemicals (sulfamic acid, calcium chloride or sodium chloride and bromine). In addition the Table shows only 0.125 moles of hydroxide for the Goodenough et al. whereas the Table discloses 2.025 moles hydroxide for the present invention. This Table does not appear to show a side by side comparison of instant invention versus Goodenough et al.'s invention. Until a side-by-side comparison is done, the instant combination of references makes the 12 wt % - 18 wt % active bromine obvious.

Telephonic Inquiry

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALTON N. PRYOR whose telephone number is (571)272-0621.

The examiner can normally be reached on 8:00 a.m. - 4:30 p.m..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Johann Richter can be reached on 571-272-0646. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alton N. Pryor/
Primary Examiner, Art Unit 1616